Nov. 18, 1924. 1,515,604

E. B. MEAD

BRAKE CONTROL

Filed Nov. 12, 1921

Fig. 1

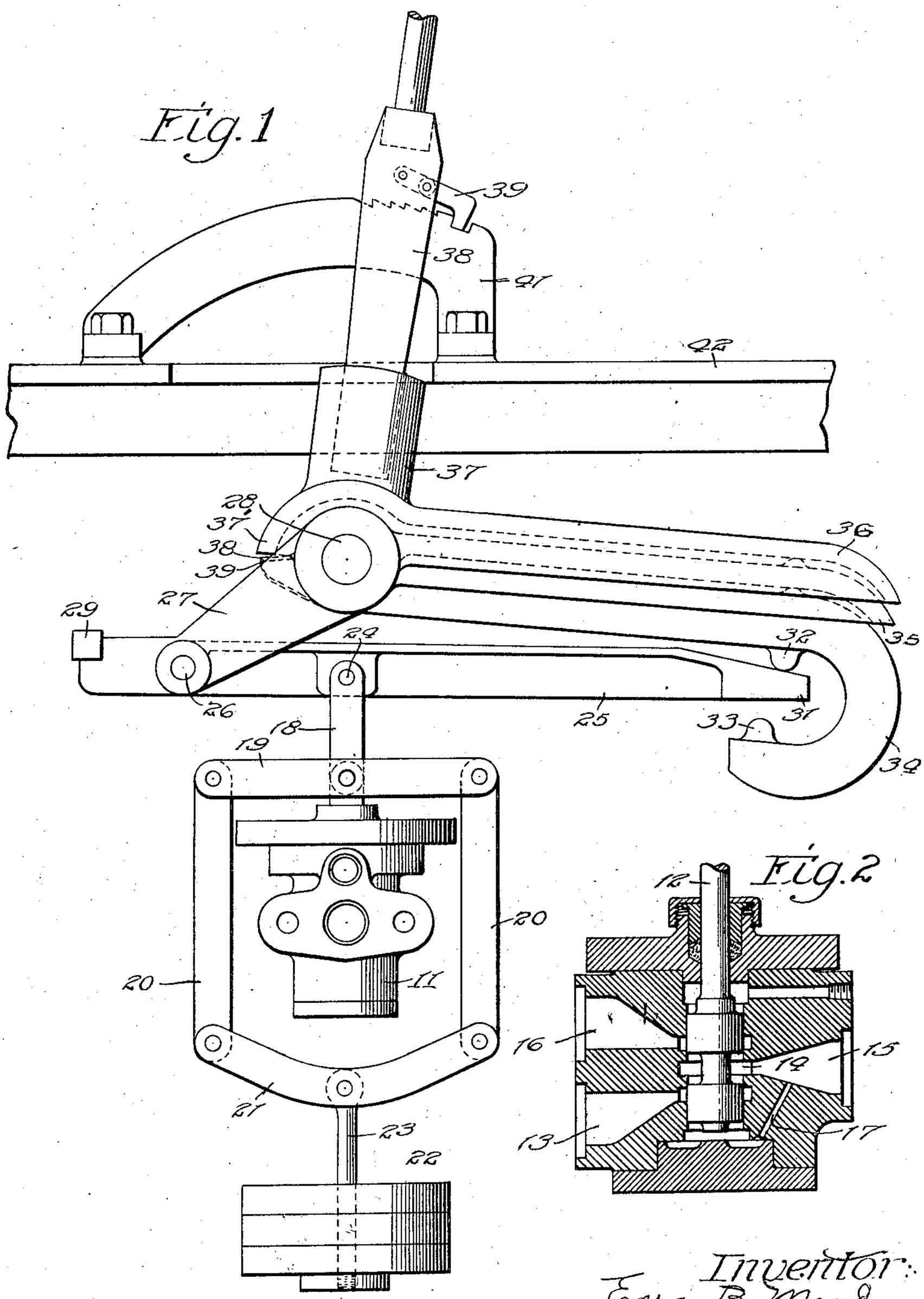

Fig. 2

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BRAKE CONTROL.

Application filed November 12, 1921. Serial No. 514,675.

To all whom it may concern:

Be it known that I, EZRA B. MEAD, a citizen of the United States, residing in Ottumwa, in the county of Wapello and State of Iowa, have invented a new and useful Improvement in Brake Controls, of which the following is a specification.

This invention relates in general to controls for brakes and while it has more particular reference to control mechanisms provided to control the brakes in mine hoists and the like it will be apparent as the invention is better understood that it has other and wider applications.

The particular embodiment of the invention selected for the purpose of illustration has reference to the subject matters of Patents No. 1,373,195 granted March 29, 1921, to Ottumwa Iron Works, my assignee, and No. 1,373,196 granted March 29, 1921, also to the Ottumwa Iron Works. From certain aspects the present invention is an improvement upon these subject matters and from certain other aspects is independent thereof.

The principal object of the present invention is the provision of a brake control which will be wholly positive in its action and which will produce a brake application proportionate to the physical pull exerted upon the hand lever or other manual control without the interposition of variable components as springs, friction and the like. Stated differently this object may be said to be the provision of a proportional control of the character just described which will be immediate in action, all possibility of lagging effect being eliminated.

Another important object of the invention is the provision of a proportional brake control of the character described wherein the braking pressure upon the hand lever will be divided into a predetermined number of major steps with intermediate variation within the range of each step.

Another important object of the invention is the provision of a closer balance within the valve mechanism itself when a fluid pressure system is employed. My invention contemplates in this regard a permanent partial counter-balancing of the valve lifting pressure.

Numerous other objects and advantages of the invention will be apparent as it is better understood from the following description, which, taken in connection with the accompanying drawings, discloses a preferred embodiment thereof.

Referring to the drawings,

Figure 1 is a side elevation of an apparatus embodying my present invention; and

Fig. 2 is a section taken through the control valve.

Referring to the drawings, reference character 11 indicates a valve casing for a fluid pressure valve 12. This valve casing may be taken in the present instance to represent a part of a fluid pressure system and for the purposes of claim may be taken to be a source of power. 13 is an inlet port, 14 a valve chamber, 15 a delivery port to the thrust cylinder (not shown) and 16 a waste outlet from the valve to the sump. A by-pass 17 communicates between the port 15 and the underside of the valve and tends to lift the valve to establish communication between ports 15 and 16 and permit the fluid under pressure within the thrust cylinder to exhaust and the brake to be applied. Referring to Fig. 1, reference character 18 indicates a link connected to the stem of the valve 12, and it will be noted that a cross member 19 is pivoted in or to this stem and supports the cross link 21 by a pair of vertical links 20. This cross link 21 in turn supports a system of weights 22 upon a carrier 23, this system of weights permanently pulling downwardly upon the valve and against the pressure of the thrust fluid beneath the valve. It is however a predetermined amount less than the upward pressure of the fluid acting only as a partial counterbalance. The upper end of the piston rod 18 is pivoted at 24 to a floating lever 25 fulcrumed at 26 in arms 27 from a cross shaft 28. The arms 27 are held at one end at 29 by the emergency devices so that during manual operation of the control, as will be presently explained, the fulcrum 26 is a fixed fulcrum. The other end 31 of the lever 25 is positioned between two manipulative points 32 and 33 of an arm 34 pivoted upon the shaft 28. Two shells or blades 35 and

36 are also pivoted upon a shaft 28 and rest under normal conditions upon the arm 34, the shell 36 also in turn resting upon the shell 35. The shell 36 is provided with a socket 37 in which is mounted a lever 38 or other hand manipulated device. This lever has a pawl 39 in engagement with a ratchet rack 41 mounted upon a suitable support 42. The shell 36 has a wide end 37′ on the other side of the shaft 28 and the arm 34 and shell 35 have respectively lugs 38 and 39 extending out therebeneath. When the parts are in the position shown in Fig. 1 of the drawing the arm 34, shell 35 and shell 36 are resting upon the end 31 of the lever 25 and maintain the valve 12 depressed with communication established between ports 13 and 15 with the result that the full force of the fluid under pressure is felt by the thrust cylinder and the brake is held in released position. When however, it is desired to apply the brake the lever is moved to the left (viewing Fig. 1) resulting in the lifting of the weight 36 and some slight application of the brake results. That is to say, this movement is accompanied by a lifting of the valve through the pressure of the thrust cylinder through the port 17 to cut off communication between ports 13 and 15 and establish a small bleed between ports 15 and 16 thus producing a slight lifting by the valve of the shell 35 and arm 34. A little increase of pressure will result in further slight lifting movement, permitting widening of the bleed between ports 15 and 16 and increased braking pressure at the brake. If greater braking pressure is desired the weight 22 is lifted under greater pressure at the hand lever and by contact of the shoulder 38 with lug 39 of blade 35 lifting movement of the blade 35 is accomplished and the braking pressure is still greater, and so on until the arm 34 is lifted by contact of lug 39 with the shoulder 37′. Shells 36 and 35 and arm 34 constitute gravity or weight units which may be successively lifted as increased braking pressure is desired. The action of this braking connection is immediate and positive there being no lag between the movement of the hand lever and the corresponding amount of brake application.

It is thought that the invention and many of its attendant advantages will be understood from the foregoing description, and it will be apparent that various changes may be made in the form, construction and arrangement of the parts without departing from the spirit and scope of the invention or sacrificing all of its material advantages, the form hereinbefore described being merely a preferred embodiment thereof.

I claim:

1. A brake control, comprising in combination, a power source for releasing the brake, a valve for controlling said power source and a brake lever controlling said valve and successively increasing gravity resistance to the hand pull on the lever inversely proportional to the amount of brake releasing pressure from said power source.

2. A brake control, comprising a brake controlling power source, a valve in said source, a hand lever for controlling said valve and including a plurality of successively lifted weight units providing resistance to the braking action of the hand lever directly proportional to the amount of braking action.

3. A brake control, comprising a brake controlling power source adapted to exercise a variable brake control, a hand lever controlling said source and independent therefrom said hand lever having gravity action resisting the action of the hand lever independently of the source of power in proportion to the braking force.

4. A brake control, comprising brake operating means, a lever for actuating the same said lever in its actuation acting successively to lift a plurality of weight units.

5. A brake control, comprising a source of fluid under pressure, a valve mechanism for controlling said fluid and normally lifted by the pressure thereof, a weight pressing directly against said valve mechanism and a lever for lifting said weight in variable amounts and in proportion to the braking action desired of said valve mechanism.

6. A valve control, comprising power brake controlling means, a hand lever operable to control said power controlling means, said lever acting against a plurality of successively applied weight units and against a variable pressure within the limits of each weight unit directly proportionate to the breaking action exercised.

7. In a brake control mechanism, the combination of a source of fluid under pressure, a valve for controlling said fluid under pressure and normally lifted by the pressure of said fluid, means permanently acting against said normal lifting movement of the valve and a proportional control acting with the lifting movement of the valve for permitting application of said brakes.

8. A brake control, comprising a source of fluid under pressure for releasing the brake, a valve controlling the same and normally lifted to brake applying position by the pressure of the releasing fluid, and two separate weight systems acting against said valve to permit arrangement of the valve to release the brake and hand lever for lifting one of said weight systems to permit application of the brake.

9. A brake control, comprising a source of

fluid under pressure for releasing the brake, a valve controlling the same and normally lifted to brake applying position by the pressure of the releasing fluid, and two separate weight systems acting against said valve to permit arrangement of the valve to release the brake, and a hand lever for lifting one of said weight systems to permit application of the brake, the weight system lifted by said hand lever whereby to permit the control of extent of brake application.

EZRA B. MEAD.